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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/525,499

09/21/2005

Valerie Bousquet

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EXAMINER

SARKAR, ASOK K

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/525,499	<b>Applicant(s)</b> BOUSQUET ET AL.	
	<b>Examiner</b> Asok K. Sarkar	<b>Art Unit</b> 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Claims 1 – 10 rejected under 35 U. S.C. 103(a) as being unpatentable for reasons of record in Paper mailed December 21, 2007 is reproduced below:

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatano, US 5,740,192.

Regarding claim 1, Hatano teaches a method of growing a semiconductor layer structure, the method comprising the steps of:

- growing a first (Al,Ga)N layer over a substrate at the first substrate temperature by MBE using ammonia as the nitrogen precursor;
- cooling the substrate to a second substrate temperature lower than the first substrate temperature, while maintaining the supply of ammonia to the substrate;
- growing an (In,Ga)N quantum well structure over the first (Al,Ga)N layer using ammonia as the nitrogen precursor;
- heating the substrate to a third substrate temperature higher than the second substrate temperature, while maintaining the supply of ammonia to the substrate; and
- growing a second (Al,Ga)N layer over the quantum well structure at the third substrate temperature using ammonia as the nitrogen precursor mainly with reference to Example II – 11 (Fig. 14) in column 24 and also with reference to Examples II – 9 (Fig. 12) and Example II – 10 (Fig. 13) in columns 20 and 21 respectively.

Hatano teaches these limitations of growing the first and second layers of (Al,Ga)N and the (In,Ga)N layer by MOCVD process but fails to explicitly teach growing these layers by the MBE process.

Hatano, however, teaches growing these (Al,Ga)N and (In,Ga)N layers by the MBE process with reference to Example II – 4 and also with reference to Example II – 6 wherein he teaches that MOCVD method can also be replaced by the MBE method in column 18, lines 21 – 27.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Hatano and grow the layers by MBE as taught by him in column 18, lines 21 – 27.

Regarding claims 2 – 4, Hatano teaches the first (Al,Ga)N layer has a first conductivity type of n – type and the second (Al,Ga)N layer has a second conductivity type of p – type with reference to Figs. 12, 13 and 14.

Regarding claims 5 – 7, Hatano teaches the first substrate temperature is within the range 850°C to 1050°C, the second substrate temperature is within the range 650°C to 1000°C and the third substrate temperature is within the range 850°C to 1050°C with reference to Example II – 11 in column 24 and MBE deposition temperatures with reference to Example II – 4 in column 13.

Regarding claims 8 – 10, Hatano teaches a light emitting diode with reference to Figs. 12, 13 and 14.

### ***Response to Arguments***

6. Applicant's arguments filed March 21, 2008 have been fully considered but they are not persuasive due to the following reasons. The Applicant alleges (page 4, starting in paragraph 3) that Hatano fails to teach the temperature ranges that are applicable to MOCVD method will be also applicable to MBE method. The Applicant

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also argues that (see page 5, last paragraph) Hatano cannot teach or suggest a method including a "first substrate temperature," a "second substrate temperature," and a "third substrate temperature" as recited by claim 1.

This argument is not persuasive. First, claim 1 is silent about a any specific temperature except to say about three temperatures except to say first temperature > second temperature and second temperature < third temperature. This is taught by Hatano with respect to MOCVD method. Assuming *arguendo* that MOCVD method is different from MBE method, it would be obvious to one will ordinary skill to follow the same protocol so far as temperature is concerned. It is possible that the quality of the final product may not be similar, but the claim limitations do not teach anything about the properties of the layers and/or structure. The Applicant is referred to a published work of Damilano, Appl. Phys. Lett., Vol. 77(9), p. 1268 (2000). Although, the layer system is slightly different (GaN instead of AlGaIn), the quantum well structures are grown at a lower temperature than the top and bottom cladding/capping layers.

The Applicant also argues (paragraphs 2 and 3 in page 5) the difficulties in achieving the higher V/III ratio at higher growth temperatures by the MBE process and the resultant poor quality of the InGaIn layer. The invention allegedly overcomes these difficulties. However, it should be pointed out these limitations are not part of any claim languages and therefore do not carry any weight.

On the other hand, the Applicant mentions that Hatano teaches growing the InGaIn layer at a temperature or 650°C (paragraph 4, page 5) which is also the lower limit for the second substrate temperature.

Furthermore, claims 8 – 10 are product by process claims and therefore are taught by Hatano irrespective of the method used.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Asok K. Sarkar/  
Primary Examiner, Art Unit 2891

May 15, 2008